



## CSCI 444

# Networking II Routers and Switches

SPRING 2021

### INSTRUCTOR INFORMATION

**Instructor:** S. Saffer, Ph.D.

**Office Location:** JOUR 235

**Office Hours:** Communication by email is welcome at any time, including evenings and weekends. Face to face conferences via Zoom are available on request.

**Office Phone:**

**Office Fax:**

**University Email Address:** sam.saffer@tamuc.edu

**Preferred Form of Communication:** email

**Communication Response Time:** Response to Emails should be no more and 24 hours.

### COURSE INFORMATION

#### Materials – Textbooks, Readings, Supplementary Readings

**Textbook(s) Required:** Materials for the major topics for this course are presented in Class Notes, which will be provided to students free of charge.

**Software Required: Cisco Simulator Packet Tracer.** This software is available to the student free of charge from Cisco.

**Optional Texts and/or Materials:** Supplemental Textbooks: On reserve in the Library for extra reading:

IP Switching and Routing Essentials. Stephen A. Thomas. John Wiley & Sons, Inc. New York. March 2001.

Data Communications, Computer Networks, and Open Systems. Fred Halsall. Addison-Wesley, Menlo Park, Calif.

Cisco Certified Network Associate Study Guide 4th Ed. by Todd Lammie. Sybex.

Computer Networks. Andrew Tanenbaum, David Wetherall (International Economy Edition) 2010.

*The syllabus/schedule are subject to change.*

## **Course Description**

This course is designed to introduce the student to the operation of Computer Network Routers and Communications Switches. Network security features involving Virtual Local Area Networks (VLANs) and Access Control Lists (ACLs) will also be studied. Students will gain practical laboratory experience working with routers and switches. Lab exercises include router and switch configuration, and the implementation of VLANs and ACLs. Prerequisites: CSCI 434.

### **Student Learning Outcomes**

#### **Student Learning Outcomes:**

- 1) Students will be able to use subnets and routing protocols, to design and to configure a router network.
- 2) Students will be able to design and configure a switched network and VLANs.
- 3) Students will be able to utilize the concepts of an Access Control List in configuring a router for ACLs.
- 4) Students will learn the basic concepts of Wide Area Networks and WAN components, and integrate the knowledge of subnets, routers, switches, VLANs, ACLs and WANs, into an understanding of modern digital computer networks.
- 5) Students will gain practical laboratory experience working with routers and switches in a modern network.

## **COURSE REQUIREMENTS**

### **Minimal Technical Skills Needed**

**Students will use Microsoft Windows 10 Operating System. Students are expected to be familiar with MyLeo Online (D2L Brightspace).**

### **Instructional Methods**

**Instructional methods include lectures and exercises, and programming assignments, which are documented in the class notes. Class notes and video lectures are included in MyLeo Online (D2L Brightspace). Students are expected to complete exercises and take practice exams, which are designed to help students determine which materials need further review. The educational process is further enhanced by the assembly language programming assignments.**

### **Student Responsibilities or Tips for Success in the Course**

**Student should attend lectures and review lectures which are included in myLeo Online (D2L Brightspace). Students should also work all assigned exercises and complete all programming assignments.**

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## GRADING

Grade Calculation:

Test #1	20%	Test #2	20%	Test #3	20%
Lab Grade	10%	Final Exam	30%		

### Assessments

Student Learning Outcome #1 – assessed by Test#1

Student Learning Outcome #2 – assessed by Test#2

Student Learning Outcome #3 – assessed by Test#3

Student Learning Outcome #4 – assessed by Final Exam

Student Learning Outcome #5 – assessed by the Lab work

An Average of Test#1, Test#2, Test#3, is 60% of the final grade.

The Final Exam is 30% of the final grade.

Lab work is 10% of the final grade.

## TECHNOLOGY REQUIREMENTS

### Browser support

D2L is committed to performing key application testing when new browser versions are released. New and updated functionality is also tested against the latest version of supported browsers. However, due to the frequency of some browser releases, D2L cannot guarantee that each browser version will perform as expected. If you encounter any issues with any of the browser versions listed in the tables below, contact D2L Support, who will determine the best course of action for resolution. Reported issues are prioritized by supported browsers and then maintenance browsers.

Supported browsers are the latest or most recent browser versions that are tested against new versions of D2L products. Customers can report problems and receive support for issues. For an optimal experience, D2L recommends using supported browsers with D2L products.

Maintenance browsers are older browser versions that are not tested extensively against new versions of D2L products. Customers can still report problems and receive support for critical issues; however, D2L does not guarantee all issues will be addressed. A maintenance browser becomes officially unsupported after one year.

Note the following:

- Ensure that your browser has JavaScript and Cookies enabled.
- For desktop systems, you must have Adobe Flash Player 10.1 or greater.
- The Brightspace Support features are now optimized for production environments when using the Google Chrome browser, Apple Safari browser, Microsoft Edge browser, Microsoft Internet Explorer browser, and Mozilla Firefox browsers.

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### Desktop Support

Browser	Supported Browser Version(s)	Maintenance Browser Version(s)
Microsoft® Edge	Latest	N/A
Microsoft® Internet Explorer®	N/A	11
Mozilla® Firefox®	Latest, ESR	N/A
Google® Chrome™	Latest	N/A
Apple® Safari®	Latest	N/A

### Tablet and Mobile Support

Device	Operating System	Browser	Supported Browser Version(s)
Android™	Android 4.4+	Chrome	Latest
Apple	iOS®	Safari, Chrome	The current major version of iOS (the latest minor or <b>point</b> release of that major version) and the previous major version of iOS (the latest minor or <b>point</b> release of that major version). For example, as of June 7, 2017, D2L supports iOS 10.3.2 and iOS 9.3.5, but not iOS 10.2.1, 9.0.2, or any other version.  Chrome: Latest version for the iOS browser.
Windows	Windows 10	Edge, Chrome, Firefox	Latest of all browsers, and Firefox ESR.

- You will need regular access to a computer with a broadband Internet connection. The minimum computer requirements are:

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- 512 MB of RAM, 1 GB or more preferred
- Broadband connection required courses are heavily video intensive
- Video display capable of high-color 16-bit display 1024 x 768 or higher resolution
- You must have a:
  - Sound card, which is usually integrated into your desktop or laptop computer
  - Speakers or headphones.
  - \*For courses utilizing video-conferencing tools and/or an online proctoring solution, a webcam and microphone are required.
- Both versions of Java (32 bit and 64 bit) must be installed and up to date on your machine. At a minimum Java 7, update 51, is required to support the learning management system. The most current version of Java can be downloaded at: [JAVA web site http://www.java.com/en/download/manual.jsp](http://www.java.com/en/download/manual.jsp)
- Current anti-virus software must be installed and kept up to date.

Running the browser check will ensure your internet browser is supported.

Pop-ups are allowed.

JavaScript is enabled.

Cookies are enabled.

- You will need some additional free software (plug-ins) for enhanced web browsing. Ensure that you download the free versions of the following software:
  - [Adobe Reader https://get.adobe.com/reader/](https://get.adobe.com/reader/)
  - [Adobe Flash Player \(version 17 or later\) https://get.adobe.com/flashplayer/](https://get.adobe.com/flashplayer/)
  - [Adobe Shockwave Player https://get.adobe.com/shockwave/](https://get.adobe.com/shockwave/)
  - [Apple Quick Time http://www.apple.com/quicktime/download/](http://www.apple.com/quicktime/download/)
- At a minimum, you must have Microsoft Office 2013, 2010, 2007 or Open Office. Microsoft Office is the standard office productivity software utilized by faculty, students, and staff. Microsoft Word is the standard word processing software, Microsoft Excel is the standard spreadsheet software, and Microsoft PowerPoint is the standard presentation software. Copying and pasting, along with attaching/uploading documents for assignment submission, will also be required. If you do not have Microsoft Office, you can check with the bookstore to see if they have any student copies.

## **ACCESS AND NAVIGATION**

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or [helpdesk@tamuc.edu](mailto:helpdesk@tamuc.edu).

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**Note:** Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

## **COMMUNICATION AND SUPPORT**

### **Brightspace Support**

**Need Help?**

#### **Student Support**

If you have any questions or are having difficulties with the course material, please contact your Instructor.

#### **Technical Support**

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778 or click on the **Live Chat** or click on the words "[click here](#)" to submit an issue via email.



#### **System Maintenance**

D2L runs monthly updates during the last week of the month, usually on Wednesday. The system should remain up during this time unless otherwise specified in an announcement. You may experience minimal impacts to performance and/or look and feel of the environment.

#### **Interaction with Instructor Statement**

**The instructor is available before and after class and during office hours. Email communication is recommended and encouraged for all other times (including evenings and weekends).**

## **COURSE AND UNIVERSITY PROCEDURES/POLICIES**

### **Course Specific Procedures/Policies**

**Attendance/Lateness:** Attendance Role is taken at the beginning of class. After a reasonable period of time, students coming in to class late will be counted absent unless the student has a reasonable excuse. Occasional tardiness will be allowed. However, if a student is chronically late to class, an explanation will be required.

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Missed exams: Students must have a reasonable excuse for missing an exam. Missed exams are usually taken at the end of the semester.

### **Syllabus Change Policy**

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

## **University Specific Procedures**

### **Student Conduct**

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the [Student Guidebook](http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx).  
<http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx>

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: [Netiquette](http://www.albion.com/netiquette/corerules.html)  
<http://www.albion.com/netiquette/corerules.html>

### **TAMUC Attendance**

For more information about the attendance policy please visit the [Attendance](#) webpage and [Procedure 13.99.99.R0.01](#).

<http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx>

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf>

### **Academic Integrity**

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

[Undergraduate Academic Dishonesty 13.99.99.R0.03](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf>

[Graduate Student Academic Dishonesty 13.99.99.R0.10](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf>

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## **ADA Statement**

### **Students with Disabilities**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

### **Office of Student Disability Resources and Services**

Texas A&M University-Commerce

Gee Library- Room 162

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: [studentdisabilityservices@tamuc.edu](mailto:studentdisabilityservices@tamuc.edu)

Website: [Office of Student Disability Resources and Services](#)

<http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/>

### **Nondiscrimination Notice**

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

### **Campus Concealed Carry Statement**

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the [Carrying Concealed Handguns On Campus](#) document and/or consult your event organizer.

Web url:

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>

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Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

### **CAMPUS NOTICE**

**A&M-Commerce requires the use of face-coverings in all instructional and research classrooms/laboratories. Exceptions may be made by faculty where warranted. Faculty have management over their classrooms. Students not using face-coverings can be required to leave class. Repetitive refusal to comply can be reported to the Office of Students' Rights and Responsibilities as a violation of the student Code of Conduct.**

**Students should not attend class when ill or after exposure to anyone with a communicable illness. Communicate such instances directly with your instructor. Faculty will work to support the student getting access to missed content or completing missed assignments.**

## **COURSE OUTLINE / CALENDAR**

CSCI 444 SPRING 2021

### **WEEK 1 January 11 – January 15**

Course Overview: Review IEEE 802.3 and IEEE 802.5  
Review LAN comparison: Routers and Switches enhanced Ethernet

### **WEEK 2 January 18 – January 22**

Review subnetting;

### **WEEK 3 January 25 – January 29**

Review: Classful/Classless IP subnetting; CIDR; VLSM

### **WEEK 4 February 1- February 5**

Configuring the Cisco Router  
Cabling considerations

### **WEEK 5 February 8 - February 12**

LAB #1: Configuration of the Cisco Series 2500 Router

### **WEEK 6 February 15 – February 19**

More of Router Configuration

### **WEEK 7 February 22 – February 26**

Routing protocols, routed protocols, Distance-vector protocols, Link -State Protocols

### **WEEK 8 March 1 – March 5**

EXAM #1 - Routing Protocols; Router Configuration

### **WEEK 9 March 8 – March 12**

Introduction to communications switches

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How to configure a switch; Spanning Tree Protocols and associated terms

**WEEK 10 March 15 – March 19**

Virtual Local Area Networks (VLANs)

**WEEK 11 March 22 – March 26**

Configuration of Switches; Configuration of VLANs

**WEEK 12 March 29 – April 2**

EXAM #2 - Switches, VLANs

**WEEK 13 April 5 - April 9**

Standard and Extended Access Control Lists ACLs

**WEEK 14 April 12 - April 16**

LAB#4: Exercises - ACL's

**WEEK 15 April 19 – April 23**

EXAM#3 ACLs

Wide Area Networks (WANs); Course review

**WEEK 16 April 26 – April 29**

**Final Exam**